

REMARKS/ARGUMENTS

Claims 1-52 are pending. Claim 3 has been amended.

Objections

The specification was objected to for failure to identify a related application by serial number. Appropriate correction has been made by way of amendment to paragraph [0001] to include the serial number, 10/602,548, of the related application.

The Notice of Draftspersons Patent Drawing Review indicates that certain drawings are objected to under various subsections of 37 CFR 1.84. Appropriate correction will be made to the drawings, and new drawings will be submitted, when the present application is otherwise indicated to be in condition for allowance.

Claim 3 has been objected to because claim 3 should apparently depend from claim 2 to correct an antecedent basis problem. Appropriate correction has been made by way of amendment to claim 3 to change the dependency to claim 2.

Claims 2, 3, 5, 6, 9-14, 18-20, 22, 23, 26-30, 33-40, 42, 43 and 46 were objected to as being dependent on a rejected base claim, but would be allowable over the prior art of record if rewritten in independent form. Applicants thank the Examiner for this indication. In view of the arguments presented herein, it is believed the rejections to the base claims to be improper. Accordingly, no amendments will be made to these dependent claims at this time, however, these claims may be amended in the future if necessary to obtain allowance.

Rejections

Claims 1, 7, 16, 17, 24, 49 and 51 were rejected under 35 USC §102(b) as being anticipated by Yamamoto *et al.*, US Patent No. 4,315,273 (hereinafter "Yamamoto").

Claims 15 and 31 were rejected under 35 USC §102(b) as being anticipated by or, in the alternative, under 35 USC §103(a) as being obvious over Yamamoto.

Claims 4, 8, 21, 25, 50 and 52 were rejected under 35 USC §103(a) as being unpatentable over Yamamoto in further view of Chin *et al.*, US Patent No. 4,443,809 (hereinafter "Chin").

Claims 32, 44 and 47 were rejected under 35 USC §103(a) as being unpatentable over Yamamoto in view of Robert *et al.*, US Patent No. 6,734,514 (hereinafter "Robert").

Claims 41, 45 and 48 were rejected under 35 USC §103(a) as being unpatentable over Yamamoto in view of Robert and further in view of Chin.

Arguments

Yamamoto discloses a semiconductor Hall effect device wherein a Sn-doped GaAs layer is formed on a surface of a substrate (single crystal) by epitaxial growth or impurity diffusion techniques.

It is respectfully asserted that Yamamoto fails to teach or suggest limitations recited in the independent claims as alleged in the Office Action.

For example, Yamamoto fails to teach or suggest the limitation of "a ferromagnetic semiconductor epilayer formed on the substrate, said epilayer defining a plane and having a cubic hard axis" as recited in independent claim 1. Similarly, Yamamoto fails to teach or suggest the limitation of "a ferromagnetic semiconductor epilayer formed on said substrate, said epilayer being substantially elongated and oriented along a cubic hard axis" as recited in independent claim 16 or the limitation of "providing a test sample including a ferromagnetic semiconductor epilayer formed on a substrate, said epilayer being substantially planar and having a cubic hard axis and being substantially elongated" as recited in independent claim 32.

In particular, Yamamoto fails to teach or suggest a ferromagnetic semiconductor epilayer formed on a substrate. Yamamoto discloses a semiconductor Hall effect device. Such conventional semiconductor Hall effect devices have been known for years as is evidenced by the issue date of the Yamamoto. However, nowhere in Yamamoto is there a teaching of a ferromagnetic semiconductor epilayer. The Sn-doped GaAs layer taught in Yamamoto is a regular semiconductor material that has paramagnetic properties, not ferromagnetic properties. In the present invention, to the contrary, a ferromagnetic semiconductor epilayer is formed on the

substrate to take advantage of the spontaneous magnetization properties of ferromagnetic semiconductor materials such as, for example Mn-doped GaAs or GaN and others. Such spontaneous magnetization properties, including retaining a residual magnetization, are not present in regular semiconductor materials such as Sn-doped GaAs, which are paramagnetic in nature. Rather, the Hall effect in such regular semiconductor materials is based on the anisotropic band structure of such conductive materials and not on a spontaneous magnetization. This paramagnetic semiconductor Hall effect is significantly weaker than the ferromagnetic semiconductor "giant planar Hall effect" disclosed in the present patent application.

Accordingly, it is respectfully requested that the anticipation rejections to independent claims 1 and 16 and the obviousness rejection to independent claim 32 be withdrawn as these rejections rely on the erroneous allegation that Yamamoto teaches a ferromagnetic semiconductor epilayer as is claimed. Further, neither Chin nor Robert make up for this deficiency in Yamamoto as neither reference teaches or suggests a ferromagnetic semiconductor epilayer as is claimed. Robert mentions in passing that Group III-V compounds (which are themselves well known) may be used in the photodiodes taught therein, however, this in now way teaches or suggests forming a ferromagnetic semiconductor epilayer as is recited in the pending claims. Thus, a combination of Yamamoto with either or both of Chin and Robert would still not teach or suggest the claimed invention.

It is respectfully requested that all rejections to the rejected dependent claims also be withdrawn based at least on their dependency from allowable independent claims 1, 16 and 32.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

Appl. No. 10/602,537
Amdt. dated November 1, 2004
Reply to Office Action of July 30, 2004

PATENT

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 925-472-5000.

Respectfully submitted,



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